UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: JUL 09 1990

SUBJECT: Best Foods Chemical Safety Audit Report

FROM: Norm Niedergang, Acting Associate Director
Waste Management Division

TO: James Makris, Director
Chemical Emergency Preparedness and Prevention Office

Enclosed is the Final Report of a Chemical Safety Audit conducted at Best Foods in Chicago, Illinois, from August 8-11, 1989. We hope that this document will further improve chemical emergency preparedness and prevention for both the facility and surrounding communities that are potentially at risk from off-site releases of hazardous substances. David Napierski, of my staff, is available should you have any questions pertaining to this Audit. His FTS telephone number is 353-3202.

Enclosure

cc: Elaine Davies
U.S.EPA H.Q. (OS-120)

bcc: Glenn Cekus (5HS-26)
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FINAL REPORT
June 20, 1990

CHEMICAL SAFETY AUDIT

OF

BEST FOODS
A DIVISION OF CPC INTERNATIONAL, INC.
CHICAGO, ILLINOIS

BY THE

U. S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF CHEMICAL EMERGENCY PREPAREDNESS AND PREVENTION
REGION V

FROM

AUGUST 8-11, 1989

REPORT DISCLAIMER

The recommendations made in this report reflect information concerning the Best Foods Facility obtained during a U. S. Environmental Protection Agency Chemical Safety Audit and from records provided by the Best Foods Facility. The recommendations contained in this report are not mandatory and EPA makes no assurances that, if implemented, the recommended actions contained in this report will prevent future chemical accidents, equipment failures, or unsafe management practices, and/or provide protection from a future enforcement action under any applicable law or regulation.

Executive Summary

This report documents the audit process and the conclusions reached during the Chemical Safety Audit conducted at Best Foods, a Division of CPC International, Inc., Chicago, Illinois. The Audit was conducted at the Facility from August 8-11, 1989, by a Team representing Region V of the U.S. Environmental Protection Agency's Office of Chemical Emergency Preparedness and Prevention. An audit Protocol developed within the Agency focused the Team's activities throughout the week and structured preparation of the final document.

Best Foods' audit was triggered by a release of 60,000 pounds of sulfuric acid on July 24, 1988, which exceeded the 1,000 pound reportable quantity (RQ). The Facility has emergency response plans and procedures to address such releases as well as detection and mitigation systems.

The Facility has only a modest potential to adversely affect the surrounding community as a consequence of a chemical release. Despite this, there are actions that the Facility needs to address to minimize potential for such releases and to mitigate their consequences. These are contained in a Section headed Recommendations at the conclusion of the Report.

REPORT ACRONYMS

AARP	American Association of Retired Persons
ARIP	Accidental Release Information Program
CAMEO	Computer Assisted Management of Emergency Operations
CEPP	Chemical Emergency Preparedness and Prevention
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CSA	Chemical Safety Audit
CSAT	Chemical Safety Audit Team
EPCRA/TITLE III	Emergency Planning and Community Right-to-Know Act of 1986
IESDA	Illinois Emergency Services and Disaster Agency
IEPA	Illinois Environmental Protection Agency
LEPC	Local Emergency Planning Commission
MSDS	Material Safety Data Sheets
NRC	National Response Center
NRT-1	A publication of the National Response Team entitled Hazardous Materials Emergency Planning Guide. This is the guidance document for LEPCs describing hazard analyses and risk assessment at facilities containing Extremely Hazardous Substances.
NRT-2	A supplemental document to NRT-1 which describes the hazard analyses and risk assessment process in greater detail.
P&ID	Piping and Instrumentation Diagram
RQ	Reportable Quantity
SARA	Superfund Amendments and Reauthorization Act
TAT	Technical Assistance Team
U.S. EPA	United States Environmental Protection Agency

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1.0 INTRODUCTION

1.1 General Information

The Office of Chemical Emergency Preparedness and Prevention (OCEPP) in Region V of the U. S. Environmental Protection Agency (U.S.EPA), which is charged with implementing the Superfund Amendments and Reauthorization Act's (SARA) Title III Program including prevention efforts in the area of episodic releases from chemical facilities, conducted a Chemical Safety Audit of a Best Foods Facility during the period August 8-11, 1989.

Best Foods, a Division of CPC International, Inc., is located at 2816 South Kilbourn Avenue, Chicago, Illinois 60623. Best Foods is a manufacturer and packager of food products for retail distribution. Their telephone number is 312/247-5800. Mr. C.O. Henderson is the Plant Manager.

For the U.S.EPA, the Audit Team consisted of the following:

Name	Affiliation	Responsibility
David Napierski	U.S.EPA	Team Leader
Glenn Cekus	U.S.EPA	Deputy Team Leader
John Elkmann	U.S.EPA/AARP	Technical Reviewer
Byron Maggos	U.S.EPA/AARP	Technical Reviewer
Alan Bauman	U.S.EPA	Verifier

Personnel contacted at Best Foods included:

Name	Responsibility
C.O. Henderson	Plant Manager
Ted Pankow	Environmental Coordinator
William McKee	Human Resource Coordinator
Donald Nelson	Vegetable Oil Supervisor
Ray Thill	Plant Engineer
Linda Parker	Asst. Quality Control Manager
Lee Henderson	Maintenance Supervisor
Michael Michowski	Maintenance Supervisor

A Chart of the Table of Organization for Facility Management is included in Appendix A.

Others contacted included James Mastersin, employed by the Department of Consumer Services of the City of Chicago's, Environmental Section, and a member of the Local Emergency Planning Committee (LEPC) for the City of Chicago, and David Urban for the Metropolitan Water Reclamation District.

1.2 Purpose of the Audit

Chemical Safety Audits are a prevention initiative of the Office of Chemical Emergency Preparedness and Prevention. They are designed to identify chemicals, processes and procedures at chemical facilities which have a propensity for episodic release of chemical which may impact the community and to call forth appropriate management responses.

A collateral prevention initiative of the Office is the Accidental Release Information Program (ARIP). This Program tracks releases of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) hazardous substances reported to the National Response Center (NRC). The U.S. EPA then sends information questionnaires to those facilities that have releases which can have significant off-site environmental impact. The ARIP program is one source for the identification of appropriate facilities for Chemical Safety Audits.

A release of sulfuric acid from the Best Foods Facility in the amount of 60,000 pounds occurred on July 24, 1988 and was reported to the NRC. This release was more than ten times the Reportable Quantity (RQ) and, thus, met one of the ARIP triggers. An ARIP questionnaire was subsequently completed by the Facility and returned to U.S. EPA on January 13, 1989.

The events leading to the trigger incident and management's responses and subsequent corrective actions following the release were examined in detail. Results of this investigation are detailed in Section 1.4: Methodology.

1.3 Report Organization

The report identifies the Facility, the auditing team, and plant personnel contacted. It describes the process which initiated the audit and develops Facility information. Subsequent sections examine chemicals of concern, processes and Facility management, and hazards which may impact the community. It also examines Facility efforts in the areas of release prevention and mitigation. The report ends with Conclusions and Recommendations.

1.4 Methodology

The following were considerations in choosing Best Foods for an audit. The release of sulfuric acid was significant in relation to the RQ. The Facility is in Metropolitan Chicago, and the release occurred at a food processing facility, a type of facility not normally associated with hazardous chemical releases.

U.S.EPA's Chemical Safety Audit process is based on a specific Protocol. Also, known as the "Blue Book." A copy of it was provided to the Facility prior to the audit together with a list of items of general concern to the Team. The Protocol was prepared by U.S.EPA personnel,

working with the American Institute of Chemical Engineers. Audit Team members were certified in the use of the Protocol, again in part, by the American Institute of Chemical Engineers. In addition to U.S.EPA professionals, the Team was augmented by AARP Grantees with considerable industrial experience.

Best Foods was notified by certified mail on June 29, 1989, that they had been selected for a Chemical Safety Audit as a result of a release of sulfuric acid in excess of 10 times the RQ. August 8-11, 1989, were the dates proposed for the audit. Mr. Ted Pankow, Best's Environmental Coordinator, confirmed the acceptability of those dates in a subsequent telephone conversation with OCEPP staff. The scope, goals and objectives of the forthcoming Chemical Safety Audit were conveyed to him at that time. A final draft of the audit was transmitted to Facility Manager Cal Henderson on May 25, 1990, by certified mail for review and confidential business information clearance. No verbal or written comments were received from Best.

Prior to the site visit the Team reviewed the ARIP Questionnaire submitted by the Facility and a collateral document - A Survey of Monitoring, Detection, Release Prevention and Public Alert Systems for Extremely Hazardous Substances. This second document had been developed for use in the preparation of the SARA Title III, Section 305(b) study to Congress in 1988.

The Audit Team's investigation of the trigger incident developed the following information. On the evening of July 23, 1988, a small leak occurred in a pump line from the sulfuric acid storage tank at the Waste Water Treatment Plant at the Best Foods Facility. As this was off-shift, plant personnel applied a water hose to the leak to dilute and carry it to an adjacent collection pond. By hindsight, this proved to be the wrong corrective action. Water reacts with concentrated sulfuric acid with the evolution of heat. Heat tends to accelerate chemical reaction. Also, the dilute sulfuric acid created is far more corrosive to steel than the concentrated acid. As a consequence of the corrective action, the leak enlarged until it was approximately 4" long and 1/4 " wide. When this enlarged leak was discovered, the plant attempted other corrective action.

A tank truck was brought in, but its portable transfer pump would not work. Best Foods' hazardous materials response contractor was not available since they were responding to another and larger scale emergency. The balance of the contents of the storage tank flowed to the ground and, then, to the Facility's waste water treatment plant. The Facility began massive introduction of liquid caustic soda so as to neutralize the acid. By noon on July 25, 1988, pH at the Facility discharge to the Metropolitan Water Reclamation District's waste water treatment plant was normal. No undue system effects were observed at the Metropolitan Reclamation District's plant.

Corrective actions included the following. Both discharge pipes were replaced with seamless extra heavy steel pipe. New valves and flanges

were installed to aid in pump-out, if that were necessary in the future. A new pump was purchased to be used only for emergency transfer of sulfuric acid and sodium hydroxide. A higher capacity caustic pump was installed also to aid in rapid neutralization, if needed. The Facility now understands the inadequacy of their initial response of applying water to a sulfuric acid leak. Also, they are aware of the danger in letting a small leak continue without adequate response in an off-shift situation.

In conducting the Audit, the Audit Team was not permitted to examine internal Corporate documents establishing policies and procedures in the area of safety and loss prevention. Other than this, the Audit Team had the full cooperation of Facility personnel.

2.0 FACILITY INFORMATION

2.1 Detailed Site Description

Best Foods is a seventy-five year old food processing and packaging plant located within the City of Chicago and is approximately 6-1/2 miles southwest of the downtown area. It employs 320 full time employees, and it is the producer of Hellman's Mayonnaise.

Land use in the area is primarily industrial and commercial with some residential development. On the south, there is a four acre parking lot; on the west, railroad tracks and an abandoned coal yard from Western Electric; and on the north, Blitz-Bodies - an 8 acre truck and bus restoration enterprise. Directly across the street from the Facility on the East and continuing eastward are residential properties consisting mostly of modest single family homes.

The site comprises 15.85 acres and is a conglomeration of buildings, storage tanks, roads and railroad tracks which have developed over its 75 year operating history to meet its manufacturing needs. The crowded nature of the site would tend to magnify the impact of a chemical release. A site plan is included as Appendix B.

2.2 Emergency Preparedness and Planning Activities

An Emergency Action Plan for response to plant emergencies was reviewed. It was last updated on August 3, 1989, one week prior to the Plant Audit. The plan addresses potential emergency situations and lays great stress on an orderly evacuation of the facility, if required. It establishes protocol for both on-shift and off-shift response. The Plant Manager or the Human Resource Manager is designated as the official spokesperson. In an emergency situation requiring outside response, the Facility initiates action by telephoning 911. The Local Fire Company will respond together with a hazardous materials response team, if required. Any additional public notification would be through the Fire Department.

The plan does not address the mandated reporting of chemical releases. However, this is addressed in a separate wallet sized card issued to employees which contains telephone numbers for Illinois ESDA, the National Response Center and the Metropolitan Water Reclamation District. A number for contacting the LEPC, though, is not included.

In a letter dated September 9, 1987, the Facility designated a Facility Coordinator to the LEPC per the requirements of Section 303 of SARA Title III. He has not been invited since then to participate in LEPC activities or in development of a Site Specific Plan for the Facility. Best Food's Tier I/Tier II Report for Calendar 1988 was reviewed, and it meets requirements under Sections 311/312 of the SARA Title III. Vinegar, or acetic acid, which would normally be reportable under Sections 311/312, is, as a food grade additive, specifically exempt from reporting under these sections.

The Facility has a Safety and Loss Prevention Program. As previously mentioned, the Audit Team was not permitted to examine these Corporate policy documents. A comprehensive Safety Manual does not exist. Subjects of concern, such as Tank Entry Procedure, are addressed by memorandum. There is an established Safety Training Program which is further discussed in Section 4.5: Training Practices. Safety meetings are held monthly. Evacuation drills are held annually.

3.0 HAZARDOUS CHEMICALS ON SITE

3.1 List of Hazardous Chemicals on Site

The following hazardous chemicals (those normally reportable under section 311 of SARA Title III) were on site:

1) Sulfuric Acid
2) Chlorine
3) Ammonia
4) Sodium Hydroxide Solution
5) Hydrogen
6) Acetic Acid (food grade vinegar)
7) Nitrogen
8) #6 Fuel Oil

This audit covers Sulfuric Acid, Chlorine, Ammonia, Sodium Hydroxide, Hydrogen and Acetic Acid as chemicals of concern.

3.2 Sulfuric Acid

Sulfuric acid is received by tank truck as 93% acid (66 degree Baume). The colorless oily liquid is soluble in water, and when diluted, it generates a considerable amount of heat. It is corrosive to metals and tissue and will char wood and most other organic matter on contact. The acid has a density of 1.841 and is not flammable. Inhalation of vapor may cause serious lung damage. Contact with eyes may result in total loss of vision. Skin contact may produce severe necrosis. Even a few drops may be fatal if the acid gains access to the trachea. Chronic exposure may cause tracheobronchitis, stomatitis, conjunctivitis and gastritis. Circulatory shock is often the immediate cause of death. It is classified as a Section 302 Extremely Hazardous Substance (EHS) and as a CERCLA Hazardous Substance. Spills of the material in excess of the RQ of 1000 pounds are reportable under both CERCLA and SARA Title III.

Although the acid is not flammable it reacts with many metals with the evolution of hydrogen, presenting an explosive hazard. When using sulfuric acid one should avoid contact with heat, water, and organic materials. Users should wear appropriate protective clothing to avoid all skin contact.

3.3 Chlorine

Chlorine is a greenish yellow gas with a pungent suffocating odor. The vapors are much heavier than air and tend to settle in low areas. It does not burn but as a strong oxidizing agent it supports combustion. It is poisonous and may be fatal if inhaled. Contact may cause burns to skin and eyes. It is classified as an air toxic. It is both a Section 302 EHS and a CERCLA Hazardous Substance and spills of the material in excess of an RQ of 10 pounds are reportable under both CERCLA and SARA Title III.

Flammable gases or fuels will form explosive mixtures with chlorine. It combines with water or steam to produce toxic and corrosive fumes of hydrochloric acid. This chemical should not come into contact with flammable materials and powdered metals. Full protective clothing and positive pressure breathing apparatus should be used to prevent exposure when exposed to vapors.

3.4 Ammonia

Ammonia is received as a liquid under pressure and contact with the liquid can cause frostbite. The liquid evaporates readily to a clear colorless gas with a characteristic odor. Although it is classified as a nonflammable gas, it will burn within certain vapor concentration limits. It is soluble in water, forming ammonium hydroxide, a corrosive liquid. Vapors cause irritation to the eyes and respiratory tract. High concentrations cause conjunctivitis, laryngitis and pulmonary edema. Contact with the skin causes burns and blistering. If absorption becomes extensive, coma may arise preceded by convulsions. It is classified as an air toxic.

Mixing of ammonia with several chemicals can cause severe fire hazards and/or explosions. Ammonia is incompatible with many materials including silver and gold salts, halogens, alkali metals, nitrogen trichloride, potassium chlorate, acid vapors, ethylene oxide, picric acid, and many other chemicals. Ammonia in a container may explode in heat or fire. Individuals should wear full protective clothing and use positive pressure breathing apparatus when exposed to high concentrations of vapor. Ammonia is both a Section 302 EHS and a CERCLA Hazardous Substance and spills in excess of an RQ of 100 pounds are reportable under CERCLA and SARA Title III.

3.5 Sodium Hydroxide Solution

Sodium hydroxide solution is received by tank truck at 50% concentration. The solution will dissolve in additional water with the evolution of heat. It is corrosive to tissue and some metals. It is nonflammable and when dry is a white crystalline solid. The solution will burn skin and eyes and is very harmful if swallowed. It is classified as a hazardous material. During use one should avoid contact with concentrated acids and powdered aluminum. Individuals should also avoid bodily contact and breathing of vapors. Sodium hydroxide is classified as a CERCLA Hazardous Substance and spills of this material in excess of an RQ of 1000 pounds are reportable under CERCLA and SARA Title III.

3.6 Hydrogen

Hydrogen is received as a liquid at very low temperature and has a boiling point of -442 degrees F. It is a colorless liquid and may be shipped only in special very heavily insulated containers. The gas at normal temperatures is lighter than air but until vapors from the liquid warm up they will be heavier than air. Contact with the liquid will cause frostbite. If inhaled in high concentrations one will experience difficulty in breathing or loss of consciousness. It is extremely flammable and the vapor will explode if ignited in an enclosed area.

Special storage equipment is needed and a vent is necessary to prevent pressure build up. It will react violently with any oxidizing substance including air.

3.7 Acetic Acid

Acetic acid is received by tank truck as a food grade additive at 12% concentration. It is a colorless liquid that is corrosive to metals, but is nonflammable. Contact with eyes causes severe irritation and permanent damage may result. Continued skin contact may cause dermatitis. It will react vigorously with bases. Individuals working with acetic acid should avoid breathing vapors and bodily contact. Contact lenses should not be worn when handling this material. Acetic acid is a CERCLA hazardous material and spills of this material in excess of an RQ of 5,000 pounds are reportable under CERCLA and SARA Title III.

4.0 Process Information

There are four process areas at the Facility, each self-contained but interconnected by piping as appropriate. These areas are served by a Power Plant which includes steam and refrigeration facilities. Linde Corporation maintains a separate Cryogenic Liquid Area at the Facility. Table No. 1 shows the use of chemicals of concern in these operating areas.

Table No. 1

Best Foods Company

Chemicals of Concern

Operating Area	Chemical
Power Plant - Steam & Refrigeration	Ammonia
Dressings Department	Acetic Acid
Oil Refinery Department	Hydrogen Sodium Hydroxide Sulfuric Acid
Syrup Department	None
Waste Water Treatment	Chlorine Sodium hydroxide Sulfuric Acid
Cryogenic Liquid Area	Hydrogen

4.1 Storage and Handling

The Facility has an extensive tank farm with tanks located in various areas of the plant adjacent to process areas and/or unloading operations. The majority of the tankage is devoted to crude or refined vegetable oils, the Facility's primary raw material. Sulfuric acid and sodium hydroxide are maintained in two storages areas, adjacent to the Waste Treatment Plant and to the Refinery Department. Acetic acid (food grade vinegar) is maintained in a diked storage area adjacent to the Dressings Department. Liquid hydrogen and liquid nitrogen are stored at a Cryogenic Storage Site maintained by Linde Corporation, the supplier of these materials.

Other chemicals of concern, ammonia and chlorine, are not tank farm materials. Ammonia is maintained in a closed refrigeration system under the supervision of stationary engineers. System losses of approximately 4,000 pounds per year are replaced by vendor tank truck deliveries

periodically throughout the year. Chlorine is received in 150 pound cylinders and is stored adjacent to its use point in the Waste Treatment Area. These materials are received by both rail and truck delivery and transferred to storage areas.

The sulfuric storage tank at the Waste Water Treatment Area, the site of the trigger incident for the Chemical Plant Safety Audit, has been repaired following the release of sulfuric acid. However, this tank has a 2" threaded and plugged bottom drain connection, for clean-out and draining during inspection and maintenance. It was mentioned to Plant personnel that it was poor practice to have threaded connections in sulfuric acid service, due to the susceptibility of threaded connections to corrosive failure versus flanged connections. The Facility plans to correct this condition on the next scheduled tank outage.

No other questionable practices or conditions were observed in the area of storage and handling.

4.2 Process Description

Oil Refinery: The Oil Refinery receives crude soy bean oil by tank car. A number of process steps are required to strip impurities, deodorize, decolorize and adjust viscosity. A significant step is hydrogenation, which saturates some of the chemical bonds in the oil and which affects such properties as consistency and melting point. This step requires bubbling hydrogen gas into a reactor vessel containing the refined oil and a finely divided nickel catalyst. The catalyst material is removed by filtration and sold for recovery of the nickel. If a significant amount of hydrogen were to leak from the process or piping, an explosion could occur in the Process Building. To guard against this, explosimeters are mounted in the building to shut down the process on the detection of hydrogen content in the air. Small amounts of sulfuric acid and sodium hydroxide are used for pH adjustment.

Dressing Department: The Dressing Department receives refined and hydrogenated soy bean from the Oil Refinery Department as the major ingredient of its dressings, mainly mayonnaise and tartar sauce. To this are added other food grade ingredients such as vinegar, eggs and sugar. The batching and mixing processes are highly instrumented and automated to maintain quality and minimize contamination. After processing in stainless steel equipment and piping, the finished product is directed to packaging lines for automatic packaging and boxing of the product. An important adjunct to the process is the sanitizing of the equipment by a clean-in-place (CIP) process utilizing circulating cleaning solutions. This is done on the third, or off, shift.

Syrup Department: The operation of this Department is very similar to the Dressing Department, except that the processing steps are simpler, involving mainly corn syrup and flavoring.

Waste Water Treatment Plant: The Facility's waste water treatment plant involves complex effluent pre-treatment which takes all process and storm effluents from the Facility and pre-treats them to bring them into conformity with the requirements of the Metropolitan Water Reclamation District. Since sewage bills are predicated, in part, by the level of additional treatment required of the District, another objective of the installation is to minimize certain contaminants. Major contaminants are fats, oils and grease.

A number of the processing steps involve the breaking of emulsions, the skimming of oils and the capture of foams. There is a market for the recovered oils. As a food plant, too, the sewage contains nutrients which promote organic growths in the sewer piping. To minimize such growths, chlorine is added on a shot feed basis. Current practice is for only one person to change out exhausted chlorine cylinders with new 150 pound cylinders.

Sulfuric acid is used in the process to reduce the pH of the incoming sewage stream below a value of 3.0 so as to prevent saponification during processing and for the acidulation of oil bearing streams to break the oil-water emulsion. Sodium hydroxide is used to, again, raise the pH value of the final discharge to the Metropolitan Water Reclamation District to a value between 5.0 and 10.0 so as to meet District requirements.

Power Plant Operations: The Facility's Power Plant is located in the basement of the Oil Refinery Building and contains fuel fired steam boilers, air compressors and an ammonia refrigeration system. Operation is under the control of stationary engineers. This area, due to limited floor space, is crowded. Neutral paint and low level lighting gives it a dingy appearance. In the event of an uncontrolled ammonia release, the Operators could have trouble escaping the premises.

4.3 Standard Operating Procedures

The Facility's waste water treatment plant is served by a detailed Operating Manual. Other plant operating areas do not have such a manual and rely on equipment manuals and word of mouth instruction. Only the Waste Water Treatment Plant has a log book procedure for documenting communication between operators and supervisors.

A number of services at the Facility, such as servicing of fire equipment or instrumentation, are done by contractors. No documentation was seen that adequately specified the services required or the results to be obtained of such vendors.

4.4 Equipment and Instrument Maintenance

The Maintenance Department, as well as Power Plant Operations and Waste Water Treatment, comes under the direction of the Plant Engineer. A

plant maintenance force addresses continuing maintenance. Instrument maintenance in the process area is handled by plant personnel, but power plant instrument maintenance is by outside contractor. Contract maintenance support is used for most major projects. Services, such as fire extinguisher maintenance, are also by outside contractor.

Lubrication practices, in most plant areas, have been reduced to a Lubrication Manual prepared by the Facility's major lubricant supplier. Federal regulations govern the kinds and types of lubricants that can be used on food handling equipment. Depending on the service, these are specified as H-1 or H-2.

Little evidence of work orders systems, equipment history, or maintenance documentation was noted.

4.5 Training Practices

Training of operating personnel was of the on-the-job variety. There was no evidence of an operator training or certification program.

In the area of safety training, a more defined policy was observed. Table 2 lists required training for management and staff:

Table # 2

Safety Training

Training	Frequency
Air Masks	Annual
Chemical Handling	Once
Confined Space Entry	Annual
Repair Kit "A"	Quarterly
General Safety	Ongoing
Fire Extinguishers	Annual

5.0 HAZARD EVALUATION and MODELING

5.1 Hazard Evaluation

The Facility does not use a formal hazard evaluation technique as a predictive or planning tool. In informal discussion, the Plant referred to a Hazard and Operability (HAZOP) study made by a consultant

approximately two years prior, but from which they have not, as yet, received a final report.

The CSAT's technical group reviewed the operation of the Cryogenic Liquid Storage Facility with Linde and Plant personnel and engaged in a simple, hypothetical form of "What If?" analysis to identify potential hazards from this system. However, a system analysis of this type or caliber is not currently a routine part of management and/or operations nor has it ever been.

5.2 Modeling

No modeling techniques are in use at the Facility.

6.0 RELEASE PREVENTION, MITIGATION, and MONITORING SYSTEMS

6.1 Potential for Significant Accidents

Of the six chemicals of concern at the Facility, two, chlorine and ammonia, are air toxics - one, hydrogen, is a gas with a significant potential for explosion, and the remainder, sulfuric acid, acetic acid and sodium hydroxide, are either liquid acids or bases.

The CSAT found no glaring examples of Facility actions or inactions which unduly increase potential for serious accidents. However, there are risks associated with these chemicals on site, and management should be cognizant of their potential impact on the community. To place this in perspective, we proceed to a discussion of risk assessment for the on-site materials.

A publication of the National Response Team (NRT) entitled "Hazardous Materials Emergency Planning Guide" (NRT-1) is a guidance document for LEPCs describing hazard analyses and risk assessment procedures for facilities containing EHSs. Specific hazard analyses and risk assessment techniques are explained in a collateral document entitled NRT-2. These capabilities are also available on software known as "Computer Assisted Management of Emergency Operations" (CAMEO). Neither Cook County's LEPC nor the Facility has taken the initiative to use these tools to perform a hazards evaluation.

Using CAMEO, the CSAT independently projected potential risk to the Facility and surrounding community from ammonia and chlorine. Plume dispersion models generated for those substances may be found in Appendices C and D.

For ammonia, we projected a worst case scenario of a continuous release of 30 pounds per minute based on a hypothetical event such as a leaking unloading hose or broken pipe fitting. Such a leak would produce a plume of 229 yards at a level of 50 parts per million, which is equal to 0.1 times the concentration which is Immediately Dangerous to Life and Health (IDLH). With a westerly wind, this plume would extend into the

residential area to the east of the Facility, but would be unlikely to cause serious health effects.

For chlorine, CSAT projected the worst case scenario as being an instantaneous release of the contents of a single 150 pound cylinder. To achieve this would require damaging a cylinder in such fashion as to shear the cylinder head. Such a release would produce a puff of chlorine gas, similar to that visualized as a smoke signal, which, at the 0.1 IDLH level, which is 3 parts per million, would be approximately 250 feet in diameter. This puff would be dissipated within 0.4 miles of the Facility and would pass any given point in less than half a minute. Again, such a release would be merely irritating.

Hydrogen gas presents no potentially toxic effects. Its main hazard would be as an explosive mixture, when confined in a building structure. Again, this is an unlikely event, but could occur through a breakdown of the container's structural integrity and/or failure of a valve in conjunction with a malfunction of the hydrogen detection system. Such an explosion, were it to occur, may shatter windows and startle residents and passers-by, but would not do serious damage off premises.

The remaining three substances are liquid. All process and storm sewers on site drain to the Metropolitan Water Reclamation District. An abnormal release of any of these substances to sewer, such as occurred in the sulfuric acid storage leak, would exceed mandated standards for sewer effluents, but would not exceed the capacity of the Reclamation District to absorb the release and would not cause any permanent damage.

6.2 Release Prevention Systems

The Vinegar (acetic acid) Storage Tank is in a diked storage area. No other release prevention systems are in place.

6.3 Mitigation Systems

In the event of an abnormal intrusion of sulfuric acid and/or sodium hydroxide into the effluent discharged to the Metropolitan Water Reclamation District, neutralization of the discharge can be effected by appropriate excess treatment with either acid or caustic. This was used in the mitigation of the sulfuric acid release. System capabilities were strengthened following that release.

6.4 Back-ups

Facility does not have critical systems requiring backups.

6.5 Monitoring and Detection Systems

The Facility's waste water treatment plant incorporates pH monitoring in the discharge to the Metropolitan Water Reclamation District. This system will alarm on either abnormally high or abnormally low pH.

The Oil Refinery Building incorporates installed explosimeters, which are checked routinely, and which will alarm and/or shutdown the system on detection of potentially explosive hydrogen concentrations. A chlorine detector is mounted in the User Building which will alarm at a chlorine level of 1 Part per million. An ammonia detector is mounted adjacent to the ammonia compressors which will alarm and/or shutdown the compressors on detection of high ammonia levels.

Both ammonia and chlorine have characteristic pungent odors. Either a minor or significant leak of these materials would be readily identified by operating personnel in the area. Procedures are in place for the routine inspection of the various monitoring and detection systems.

CONCLUSIONS

1. Best Foods has a modest potential to adversely impact the community as the result of an episodic release of a hazardous chemical. The two air toxic chemicals present at the Facility are not present in amounts or under conditions which would lead to a significant release under a worse case scenario. Other hazardous materials present would either be contained on site, routed to the Water Reclamation System, or would have no toxic effects.

2. The Company's initial response to the sulfuric acid release was not appropriate. When they became aware of a significant leak, they responded quickly and decisively. They did find that contingency planning, such as the availability of resources, did not meet expectations. However, repairs and corrective actions were comprehensive. Moreover, the Company gained valuable insight in planning for and responding to chemical emergencies.

3. While the Facility has plans, procedures, training and equipment in place for response to and mitigation of chemical releases, there are a number of actions which can and should be taken to improve on these responses. These are detailed under Recommendations.

RECOMMENDATIONS

1. An emergency response directive to staff, as well as a wallet-sized handout, did not reference required notification of a release to the City of Chicago LEPC. The directive should list those chemicals requiring response notification under Section 302 of SARA Title III as EHSs and those referenced under CERCLA, together with their reportable quantities (RQ).

2. Facility personnel are now aware that the initial responses to the trigger incident sulfuric acid leak were inappropriate, i.e., applying water to acid and steel and delaying response to a leak of a hazardous chemical. This information should be discussed with all appropriate plant personnel.

3. It was noted that a 2" threaded drain coupling was welded into the bottom of the above sulfuric acid storage tank. It is poor practice to have a threaded fitting in acid, due to succeptability to thread corrosion. Plant management said the fitting is to be "changed out" on the next scheduled outage. This should be confirmed.

4. Current practice is for only one person to remove and replace 150 pound chlorine cylinders at the chlorine addition header. A second person should be in attendance in visual contact with the operation at all times.

5. Ammonia compressors are located in a confined basement power facility. Five minute escape masks should be readily available to the two operators in the event of an uncontrolled release of gaseous ammonia.

6. Plant Management should periodically employ some form of Hazard Analysis. The simplest form is "What If?" analysis. Use of such analysis is ideal for identifying and planning for potential emergency situations.

7. Facility housing the Plant's steam boilers and ammonia compressors appears dingy and crowded. Steps, such as improved lighting and/or painting, should be taken to upgrade the appearance of this area which could be a significant source for a chemical release.

8. The Facility has only a minimal Preventative Maintenance Program, centering mainly on lubrication. It should investigate expanding its Preventative Maintenance Program to include the following elements:

   a) Identify all process control and safety release devices. Establish schedules for both maintenance and testing, e.g., either bench testing or functional tests as appropriate.

   b) Lubrication program should be extended to all plant areas. Scheduling and documentation should be improved.

c) Formalize machinery and equipment inspections. Non-destructive testing devices such as metal thickness indicators and vibration monitors should be investigated.

9. A number of services at the Facility such as servicing of fire equipment or instrumentation are provided by contractors. We feel some concern that the contracts for these services may not adequately specify the services required or the results to be obtained. The Facility should satisfy itself that this is so.

10. Corporate Headquarters does not have a Safety Manual specifying safety procedures and policy. Safety memoranda prepared by the Facility, such as Tank Entry Procedure were reviewed. Such procedures belong in a Corporate Manual which reviews all procedures necessary for effective operation. A Loss Prevention Manual, which was observed, is no substitute for a Safety Manual.

11. Communications is essential to release prevention. Only Waste Water Treatment had a log book procedure for communication between operators and supervisors. Such log book procedure should be initiated in all operating areas.

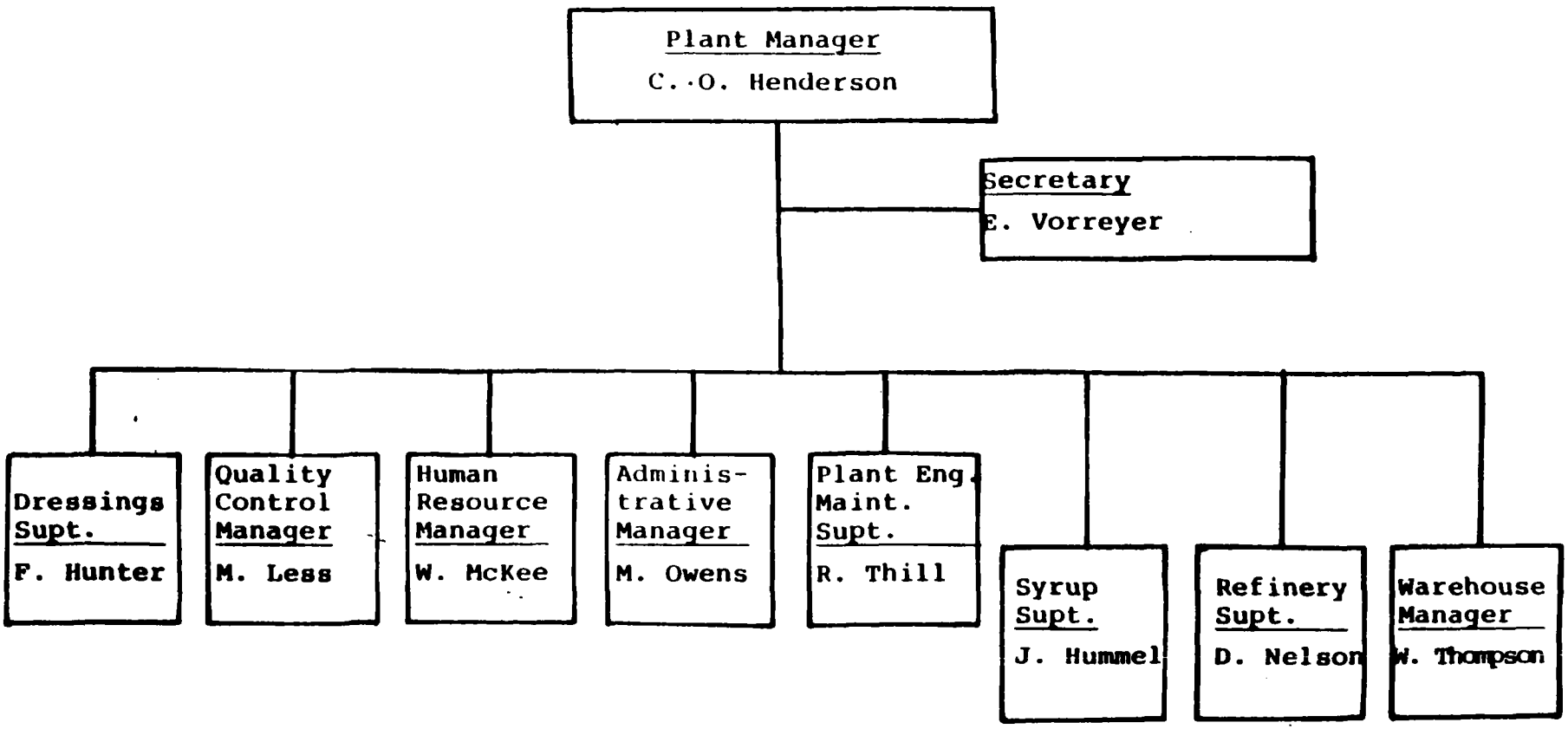
APPENDICES

Chemical Safety Audit
Best Foods

August 8-11, 1989

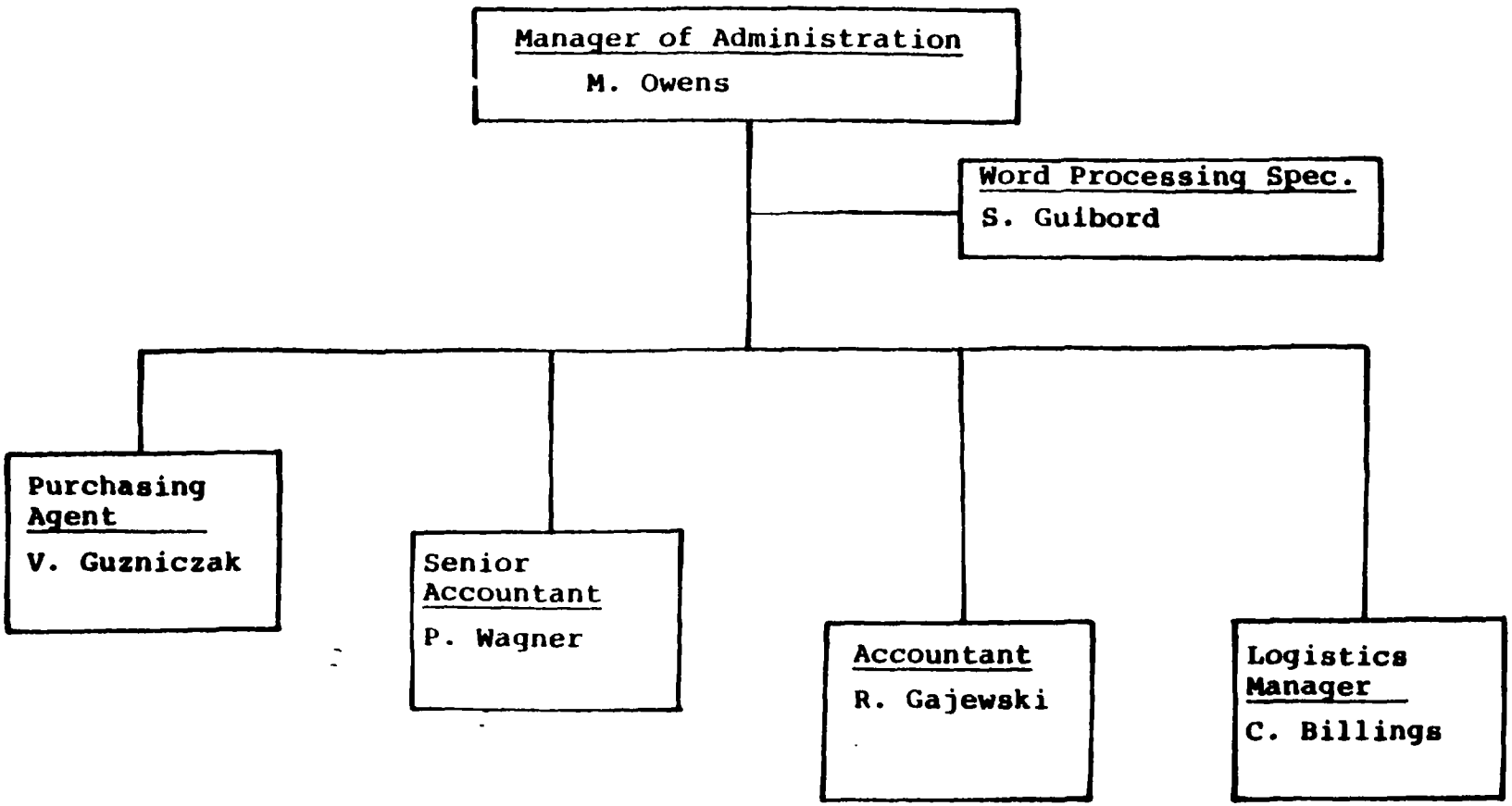
CHICAGO PLANT

PLANT MANAGER'S STAFF



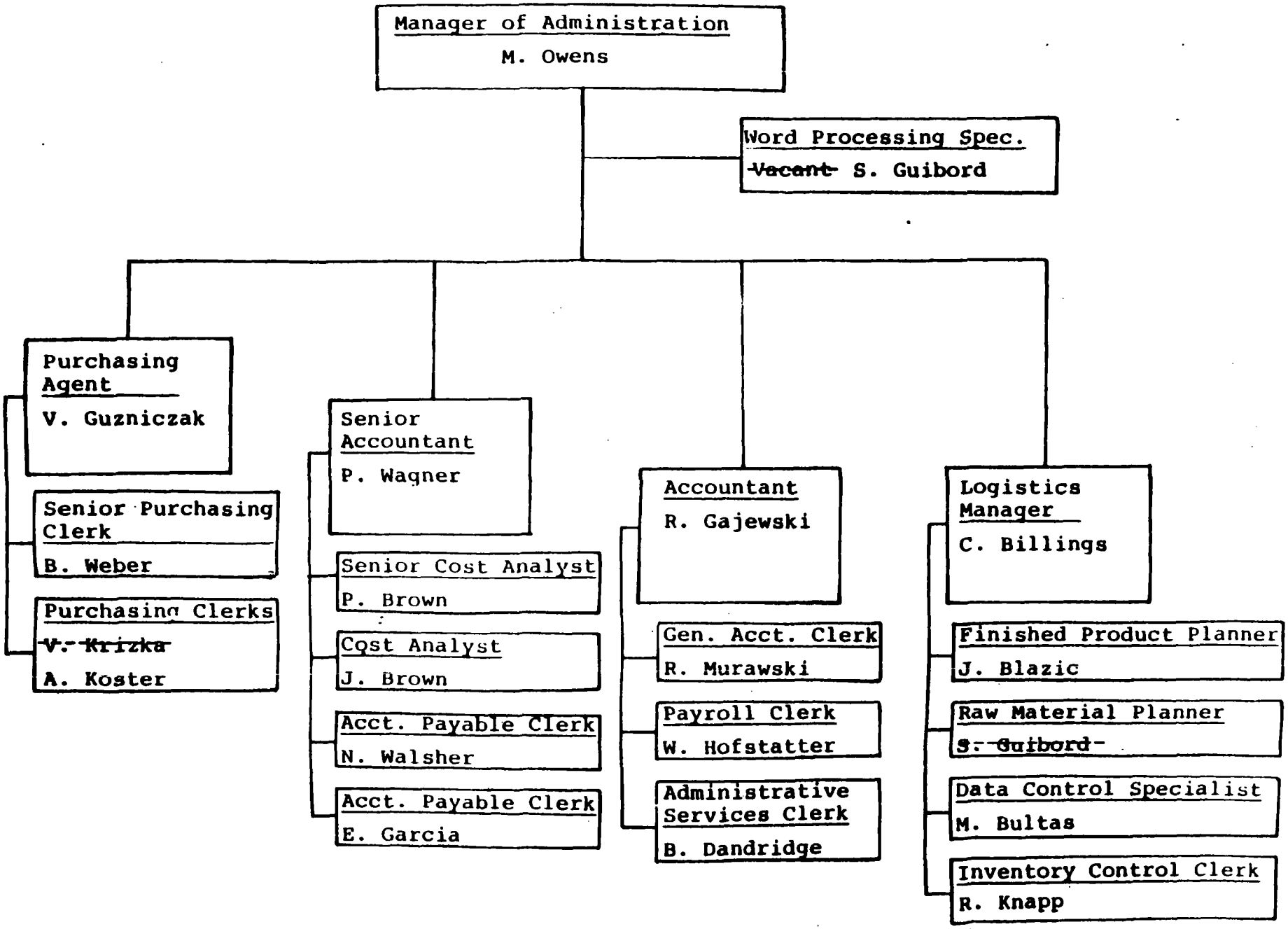
CHICAGO PLANT

ADMINISTRATIVE DEPARTMENT



CHICAGO PLANT

ADMINISTRATIVE DEPARTMENT



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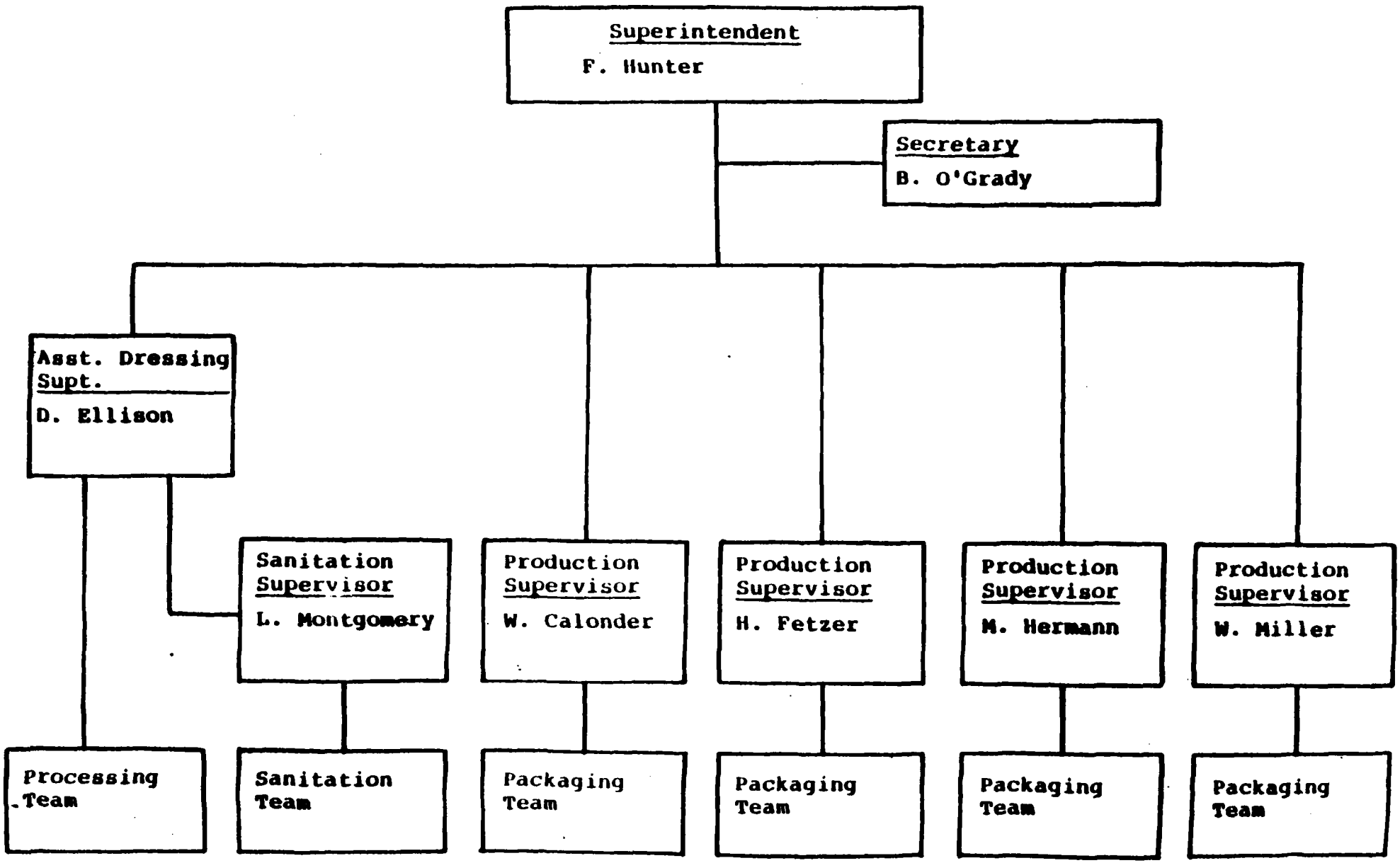
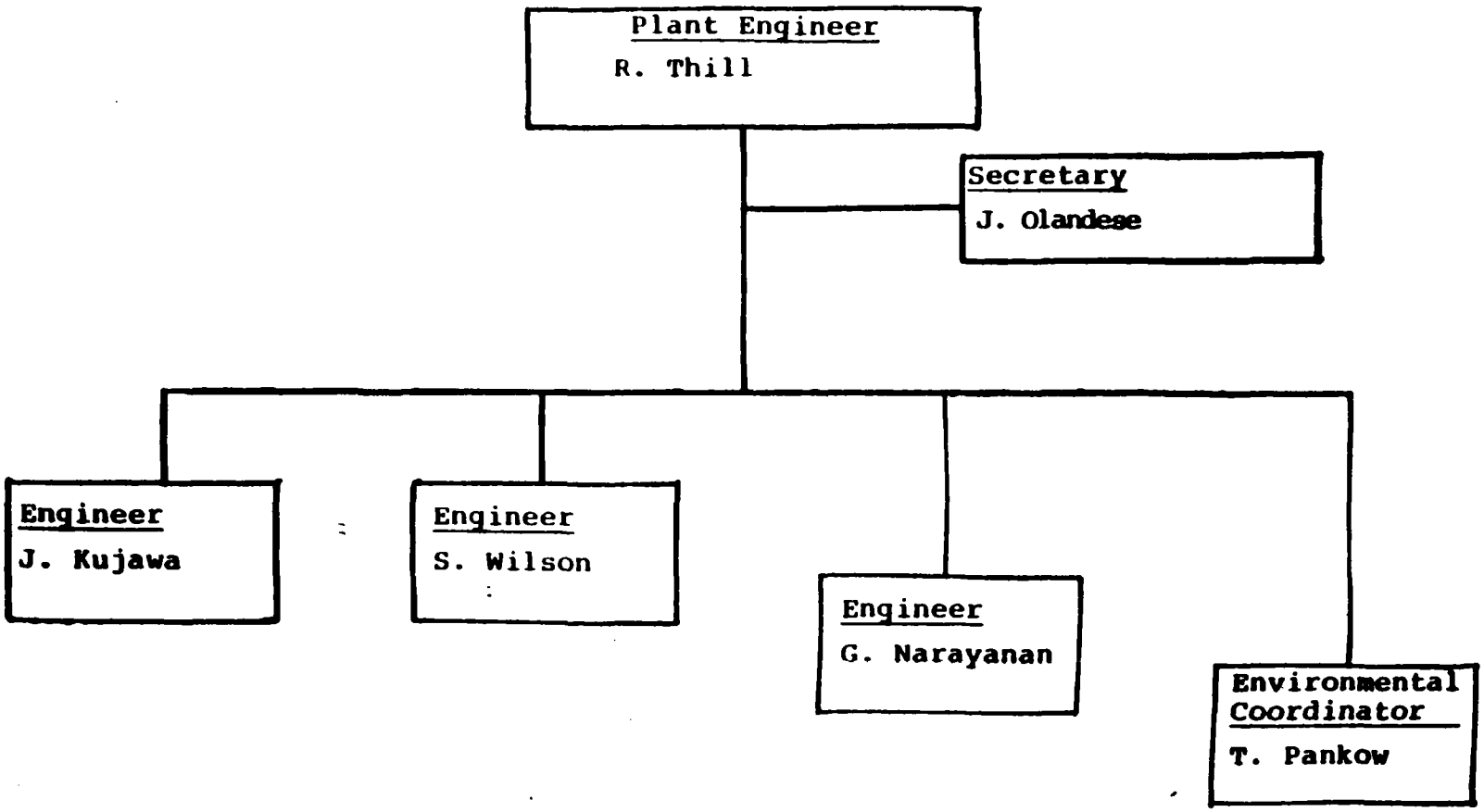
CHICAGO PLANT

DRESSINGS DEPARTMENT



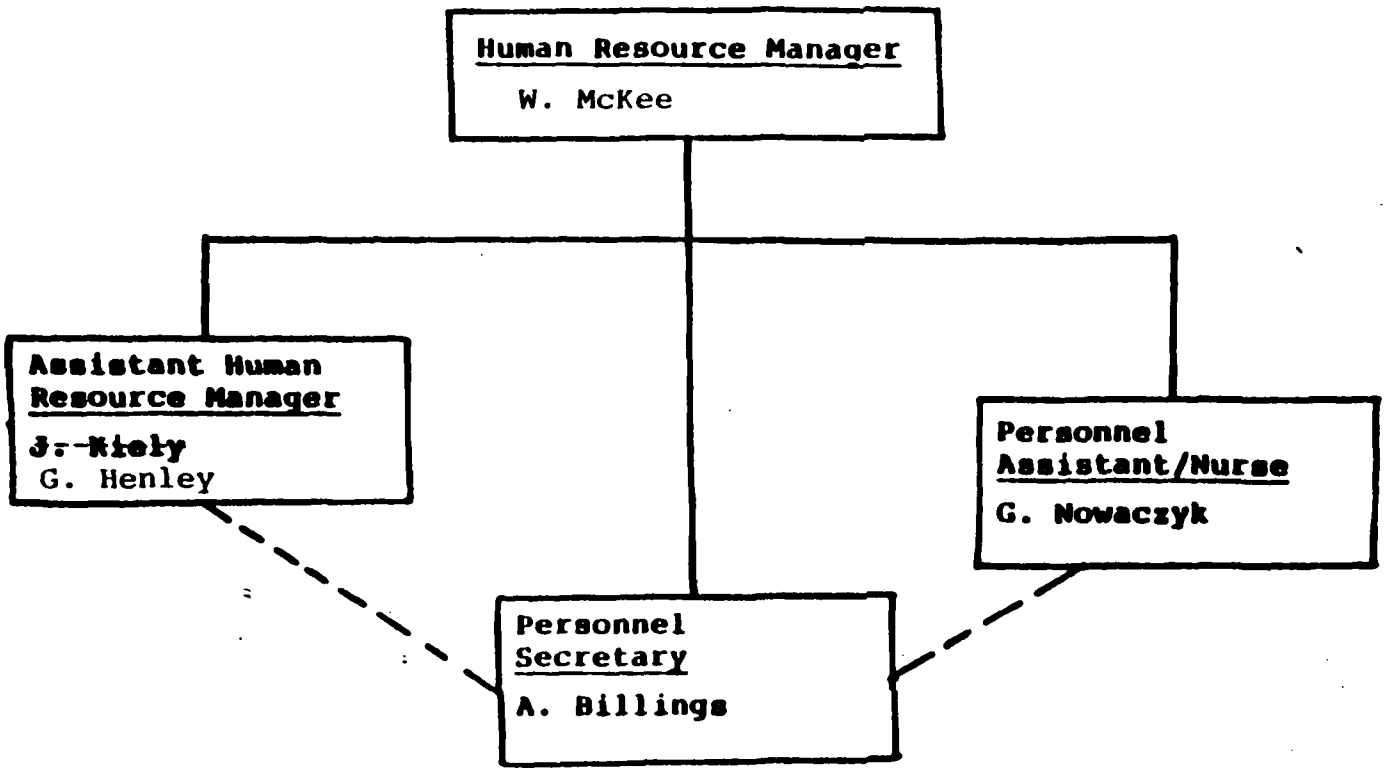
CHICAGO PLANT

ENGINEERING DEPARTMENT



CHICAGO PLANT

HUMAN RESOURCE/PERSONNEL DEPARTMENT



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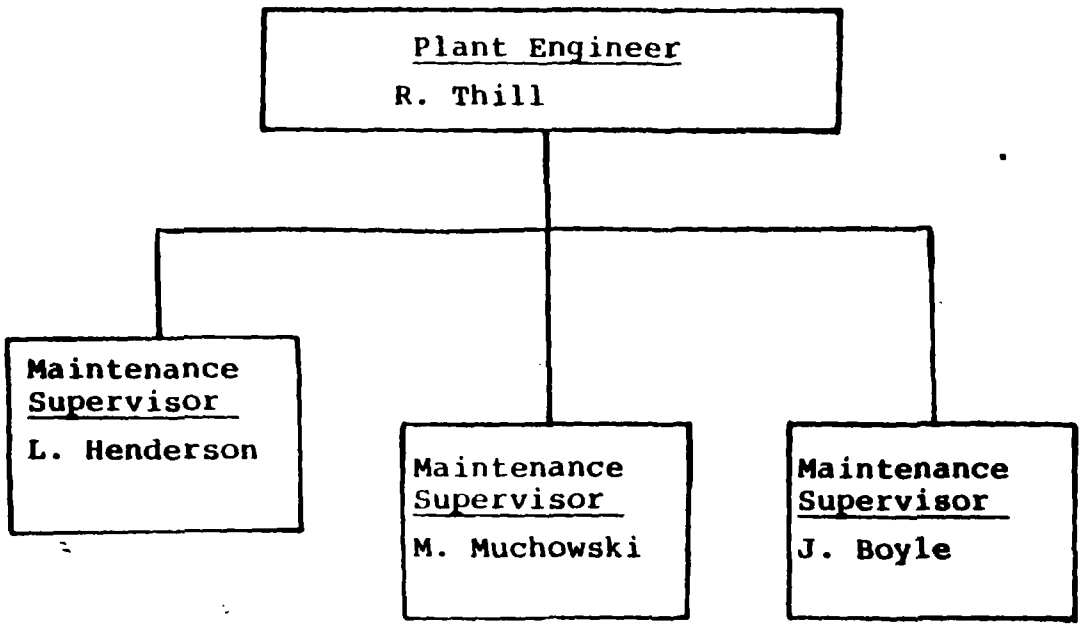
CHICAGO PLANT

MAINTENANCE DEPARTMENT



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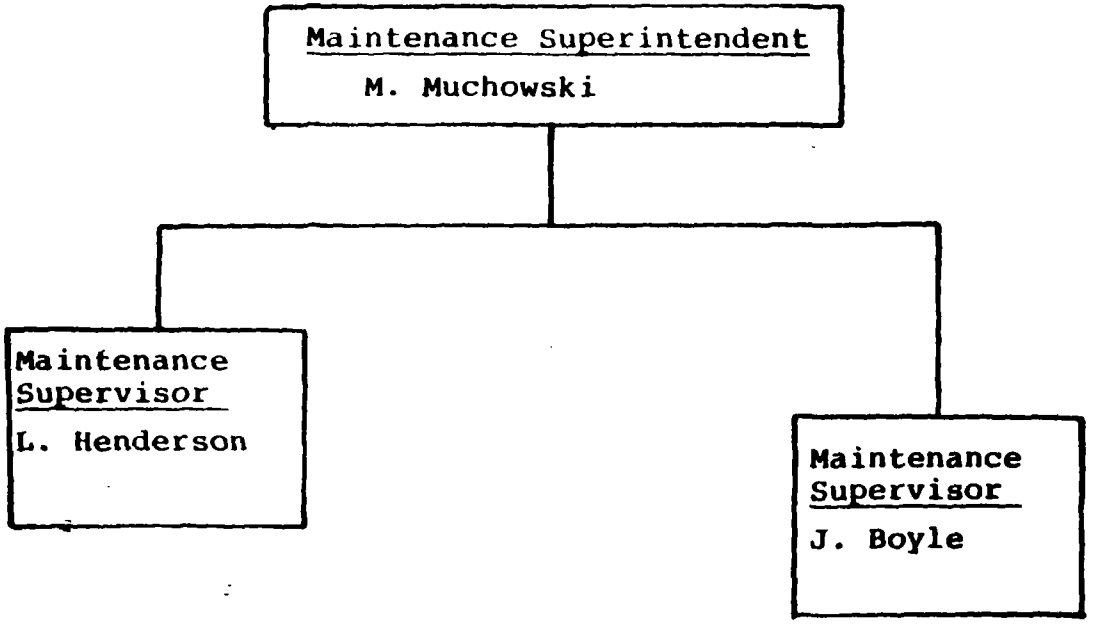
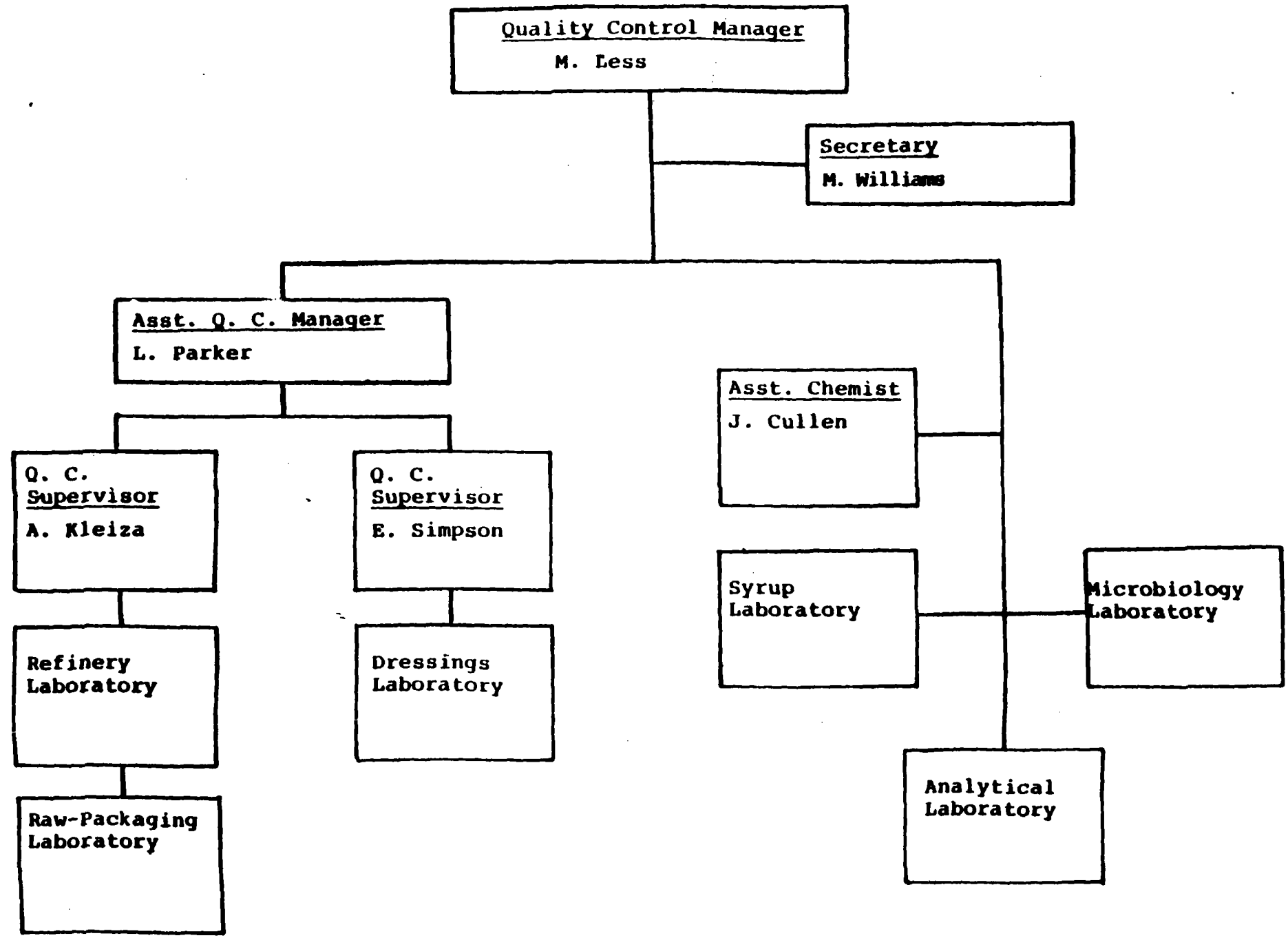
MAINTENANCE DEPARTMENT



CHICAC PLANT

QUALITY CONTROL LABORATORY



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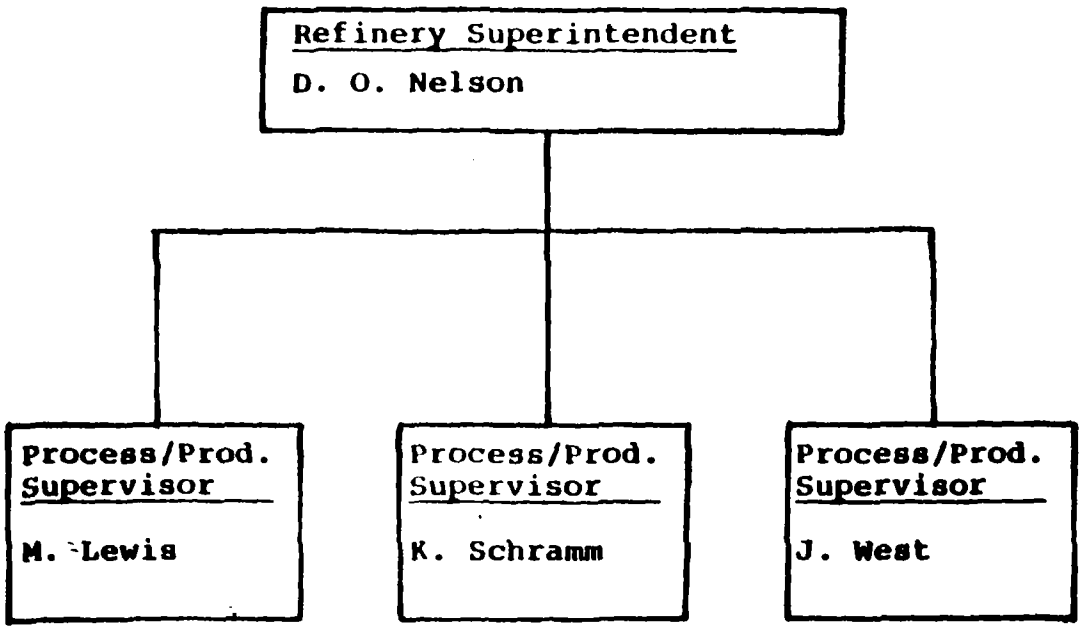
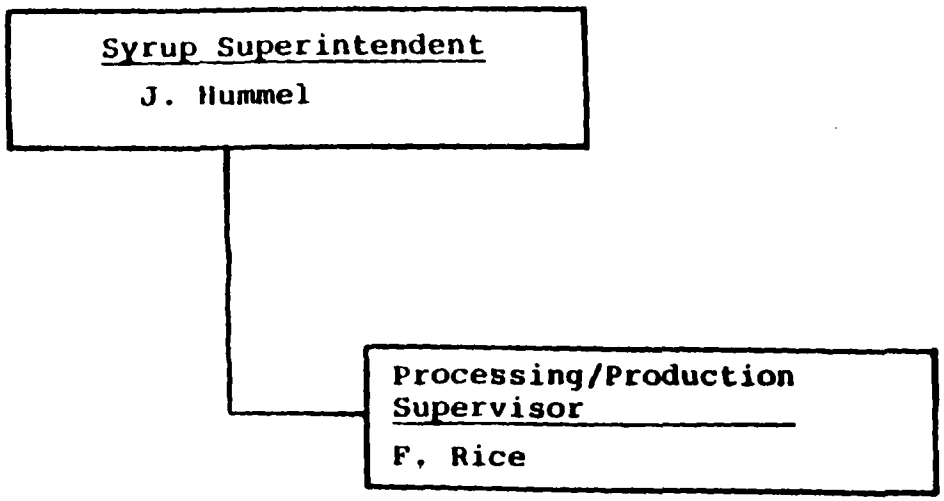
CHICAGO PLANT

REFINERY DEPARTMENT



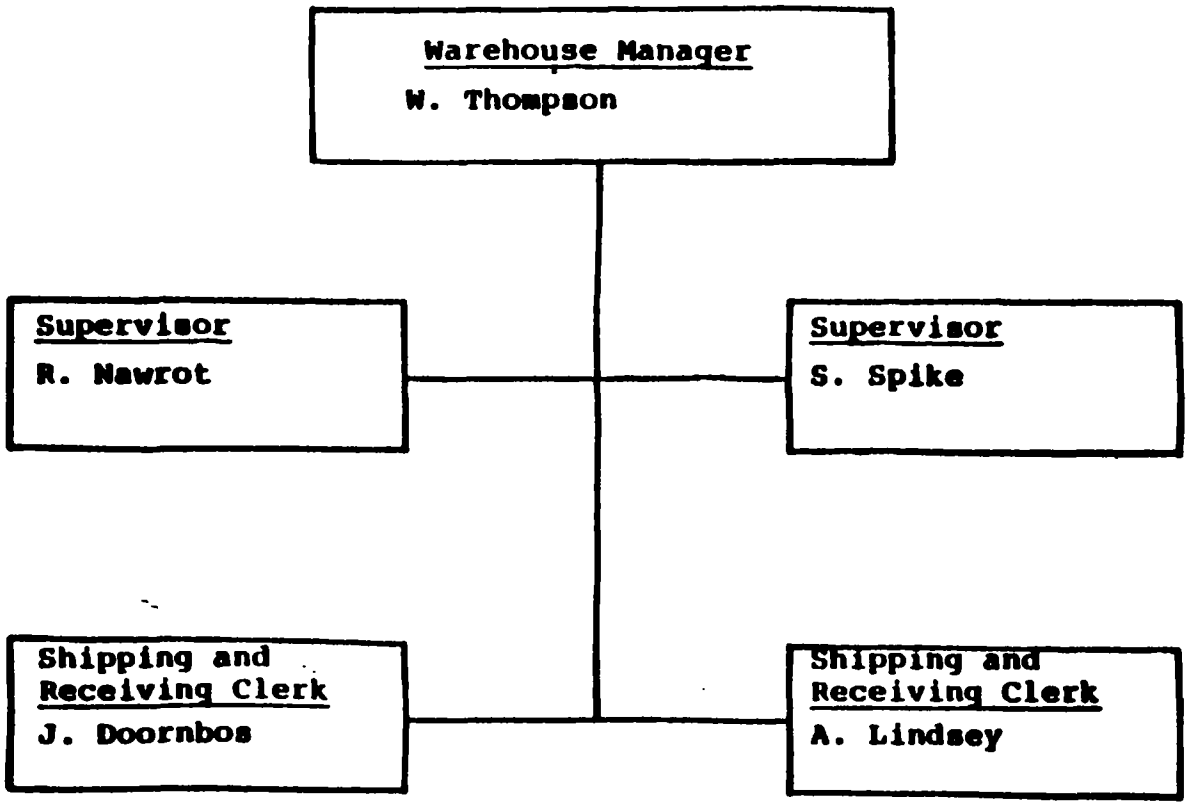
CHICAGO PLANT

SYRUP DEPARTMENT

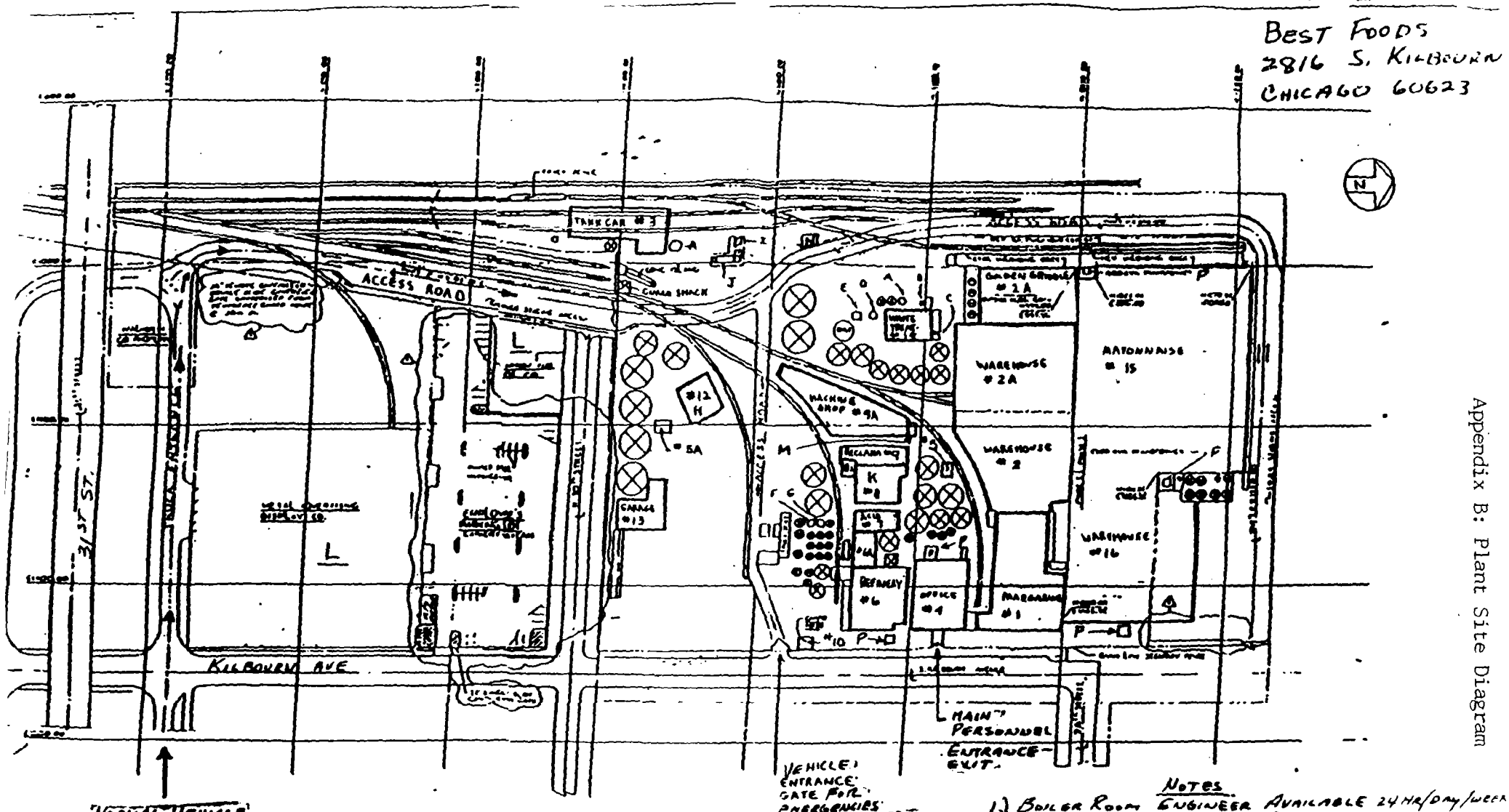


CHICAGO PLANT

WAREHOUSE DEPARTMENT



BEST FOODS
2816 S. KILBOURN
CHICAGO 60623



PLAN

Appendix B: Plant Site Diagram

NOTES

1.) BOILER ROOM ENGINEER AVAILABLE 24 HR/DAY/WEEK
2.) EMERGENCY PLANT WIDE PAGING SYSTEM HAS BEEN INSTALLED - ACTIVED BY RECEPTIONIST DURING NORMAL WORKING HOURS AND BY GUARD ON OFF HOURS

ISSUED FOR CONSTRUCTION

LEGEND

- A - CAUSTIC STORAGE TANK
- B - SULPHURIC ACID STORAGE TANK
- C - CHLORINE ADDITION TANKS and STORAGE AREA
- D - OIL CONCENTRATION TANK
- E - #3 CATCH BASIN
- F - ACID TANK - SULPHURIC
- G - CAUSTIC TANK
- H - HAZARDOUS WASTE (SOLVENTS) STORAGE SOLVENT STORAGE AREA (DRUMS) AND PAINT STORAGE
- I - NITROGEN STORAGE TANK
- J - HYDROGEN STORAGE TANK
- K - HYDROGENATION BLDG.
- L - NOT CPC PROPERTY

- ⊖ LIQUID SUGAR STORAGE TANKS
- ⊗ VEGETABLE OIL STORAGE TANKS
- ● VINEGAR STORAGE TANKS

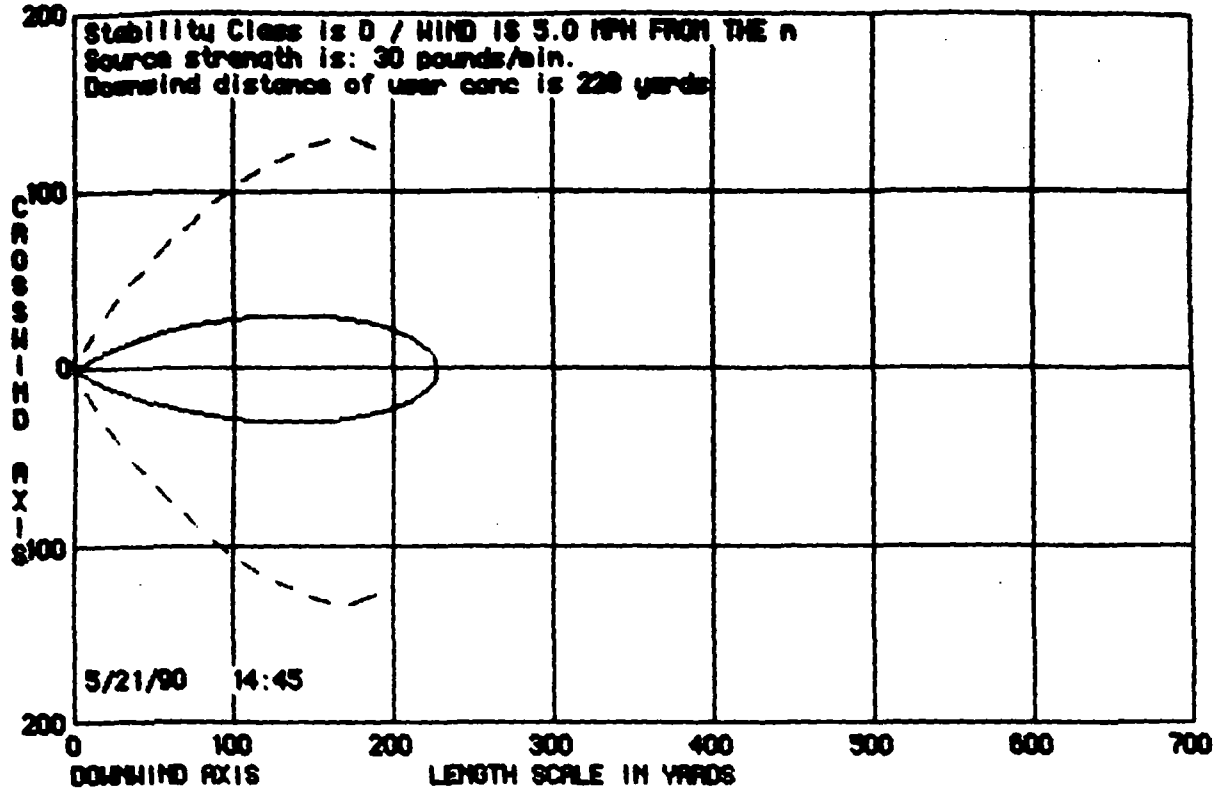
M - GAS CYLINDER STORAGE
N - PROPANE TANK " FOR LIFT TRUCK FUEL.
P - INCOMING POWER TRANSFORMERS

UPDATED — 10/7/86 JAP

BF-870-CH — MAYONNAISE FACILITY
Best Foods — CPC
GENERAL ARRANGEMENT
E 03 0C 01 009

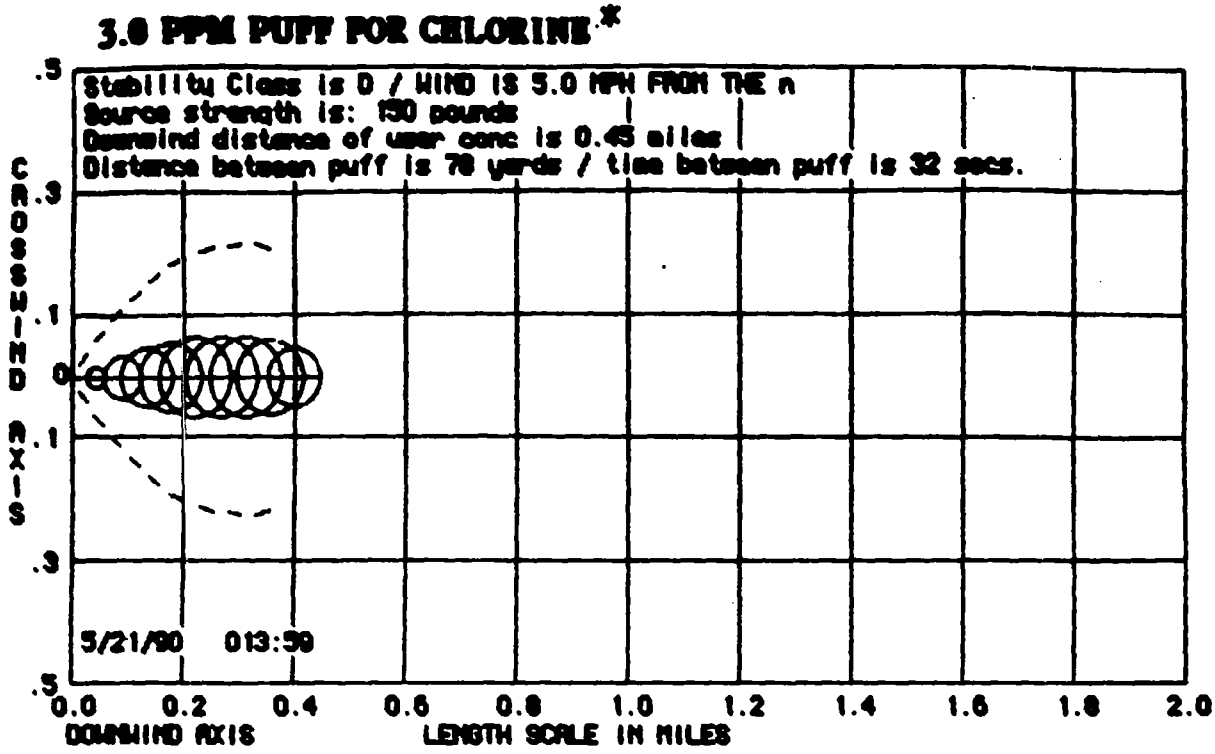
APPENDIX C
AMMONIA PLUME DISPERSION MODEL

50.0 PPM CONTOUR FOR AMMONIA, ANHYDROUS*



*Community residences are all at least 100 yards away from the source. A continuous release of ammonia under a worst case scenario would result in a concentration of 0.1 of the IDLH which would be irritating but not injurious.

APPENDIX D
CHLORINE DISPERSION MODEL



* Community residences are all at least 0.1 miles away from the source. Release of chlorine under the worst case scenario would result in a concentration of 0.1 of the IDLH which would be irritating but not injurious. The cloud would be dispersed within 5 minutes.